A study examining the appropriateness of a self-rated alcohol-related clinical confidence tool as a method of measurement among registered hospital nurses using Rasch analysis

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Abstract

Aims This paper is a report of a study which seeks to determine if self-reported estimates of RNs' self-rated confidence in responding to alcohol use in patients, is a psychometrically sound measure.

Background Alcohol-related harm is a global public health problem. Nurses are the largest group of health professionals world-wide, with evidence showing that despite being well-placed to respond they are not engaging in this important role.

Design Instrument development.

Method The study was a survey set in a large teaching hospital in England, UK. The Clinical Confidence Questionnaire was made available to a convenience sample of 200 RNs in 2007, with a response rate of 22%. Rasch analysis was used to develop a scale for future learning based on the conjoint estimates of registered hospital nurses abilities to meet needs of patients requiring nursing care of different complexities related to alcohol use in patients.

Results Outcomes verify that registered hospital nurses self-rated clinical confidence measures for their own nursing abilities in responding to alcohol use in patients can be reliably estimated and a hierarchical scale of learning can be generated to inform curricula content and learning processes.

Conclusion Current health policy in the UK identifies nurses as having a role in responding to alcohol-related harm. More focus should therefore be placed on ensuring that they are prepared to fully engage with patients in assessing and responding to alcohol use through specific education, training and skill development. The self-rated clinical confidence tool offers evidence as an acceptable method of measurement in this area.

Keywords: nurses, alcohol, patients, self-rated clinical confidence, questionnaire, Rasch analysis, Instrument development

Summary Statement

Why is this research or review needed?

- The Rasch model is under-used in nursing research
- Nurses perceive assessment and discussion of alcohol-related behaviours with their patients as difficult to do
- There is limited knowledge of nurses self-rated confidence and appropriate measurement instruments

What are the three key findings?

- The conjoint measurements of nurse abilities to the differing complexities of nursing skills needed in caring for patients experiencing alcohol-related harm can be placed on a hierarchical linear scale
- The developed scale and the participant responses are seen as one reliable mechanism for developing both curriculum content, learning processes and assessment methods for those studying patients nursing care in relation to alcohol–related harm

How should the findings be used to influence policy/practice/research/education?

- Further research is needed to understand why specific areas of clinical confidence in assessing and responding to alcohol use amongst patients are perceived by registered hospital nurses to be difficult
- Targeted training and education programmes are essential to enhance registered hospital nurses perceived clinical confidence in assessing and responding to alcohol use in patients
- Evaluation of the impact of targeted alcohol training and education is needed

INTRODUCTION

Vital education insight can be gained by analysing participant data derived from attitudinal rating scales regarding specific aspects of clinical confidence that nurses perceive to be barriers, when assessing and responding to alcohol use in patients. This form of measurement is undertaken for different reasons but fundamentally it is to estimate participants' intensity and consistency of their thoughts and feelings to some value or belief being estimated. In an educational context, attitude measurement can pinpoint where learning needs to take place and provides educators with direction as how learning can best take place. The self-rated clinical Confidence Questionnaire was designed to estimate RNs' perceptions in the complexity of assessing and responding to alcohol use in patients in the context of Bandura's self-efficacy theory (Bandura, 1986).

Background

The concept of self-efficacy (beliefs concerning one's capabilities to learn or perform behaviors at designated levels) has developed from Bandura's work (1986) and continues to be applied to a variety of educational settings at different levels in Nursing. Bandura (1986) suggested that the level of self-efficacy held by an individual relates to their expectations of being able to master any given skill. Consequently, perceived confidence influences whether or not an individual will be able to engage in a particular behaviour or learn tasks. This suggests that if a RN is confident in their ability to engage in any given clinical skill, they are more likely to learn effectively. Therefore, gathering nurses' estimates of their abilities and confidence to work with patients who suffer from alcohol-related harm, from self-reported rating scales which explore a range of skills required of them offers a valuable mechanism for educational research to inform clinical practice. Nurse educators could monitor self-efficacy

development during the progress of student nurse training to ascertain if such confidence levels are developing in a positive manner.

Blackman (2003) and Groenkajer (2003) highlighted that despite concerted efforts to help undergraduate nurses to deal successfully with patients suffering from alcohol-related harm through existing educational programs, difficulties persist. This may be due to the lack of work undertaken in this area, whereby, the different aspects of perceived nursing care required that meet the needs of patients with alcohol problems can be identified through self-rated ability. It would therefore be useful to identify the hierarchy of self-rated clinical confidence in the context of self-efficacy which, if measured over time would assist in establishing if increased learning has taken place (Yates 2005).

There has been no detailed exploration of registered hospital nurses' self-rated clinical confidence in the area of alcohol use in patients in the UK. In addition the authors are unaware of any existing instruments that measure this concept in nurses. The application of a Rasch Analysis to the self-rated clinical confidence Questionnaire will provide detailed item identification. If we are able to identify specific aspects of nurses' clinical confidence in responding to alcohol use in patients this would enable and inform the development of targeted high quality alcohol-related education for pre- and post-registration nursing education.

The Study

Aim

The aim of this study was to: to determine if self-reported estimates of RNs' self-rated confidence in responding to alcohol use in patients, is a psychometrically sound measure.

Methodology

Rasch analysis

Rasch theory underpins a group of measurement models that identify latent traits; where questions (items) from scales and the participants' subsequent scores are co-located along the same scale of the latent trait (Bond & Fox 2001). Scale item location (expressed as a range of difficulty or complexity) and participants' measures (expressed as participant ability) are analysed separately to produce estimates for each parameter which are sample and item independent respectively (Ko *et al* 2009). Rasch analysis provides the opportunity to assess the functioning of a scale in relation to response bias, dimensionality, response format, item content and appropriate targeting of the scale (Bond & Fox 2001; DeVellis 2003; Pallant & Tennant 2007). As in educational research, the advantage of using Rasch analyses in health related literature over traditional psychometric analyses includes its capacity to reduce the number of questions (items) in scales while retaining the rigour of the psychometric properties of the instrument.

Design

Setting and sample

The study was conducted across 30 wards of a large teaching hospital in England with a population of 200 RNs. The clinical areas from where a convenience sample of Adult RNs (n=43) was recruited were Health Care of the Older Person, Medical, Surgical and Critical Care wards, giving a response rate of 22%.

Data collection

The researcher approached the relevant ward manager in person to explain the study and discuss data collection procedures. Posters advertising the study were placed on the staff notice board of each ward 7 days prior to the start of the data collection. On the start date, envelopes containing study questionnaires, information volunteer sheets and a pre-addressed envelope were placed next to the posters to be completed and returned to the researcher via the internal post by those wishing to participate. A reminder of the study closing date was placed on the poster 1 week prior to the end of data collection. The data collection period lasted 4 weeks. Data collection took place during October and November 2007.

Ethical considerations

Ethical approval was granted from the both the Local Research Ethics Committee (LREC) and Research & Development office.

Instrument

Questionnaire

The study questionnaire comprised of two sections. Section 1 collected participants' demographic characteristics: gender, clinical area of practice and number of years in practice. We were unable to collect data regarding participants' age due to ethical approval restrictions. Section 2 comprised the Clinical Confidence Questionnaire devised and reported on by Blackman *et al* (2006) which is a 40-item self-report tool rating self-rated clinical

confidence in performing tasks of different complexity, relating to assessing and responding to alcohol use amongst patients. A four point likert scale using the categories: 'Very easy to do (4); easy to do (3); difficult to do (2); and too difficult to do (3)' was employed. These scale categories are synonymous with a single ability continuum, based on the nurses' self-rated estimates to engage with different survey items of various complexities (representing nursing care), being surveyed.

Data analysis

Study data were entered into a Statistical Package for Social Sciences (SPSS) (version 15.01) file for analysis and its descriptive statistics were used to explore the demographic data. Rasch analyses of the participant responses were undertaken using Conquest software, developed by the Australian Council of Education (Wu *et al* 1997).

Validity and Reliability/Rigour

A fundamental assumption of Rasch analysis is that items used in the survey, are each required to be measuring the same or one underlying construct or attribute being estimated; commonly referred to as unidimensionality (Bond & Fox 2007).

Psychometric qualities of the survey scale: individual item fit statistics of the scale

According to the Rasch model, all scale items are assumed to have equal discriminating power in identifying the underlying construct being estimated. All scale items therefore should have infit item fit statistics (or are equivalent) to a pre-determined range, irrespective

of which groups of participants are taking the survey. Figure 1 depicts how well each of the survey items met the requirements of unidimensionality (or fit) of the Rasch model.

Items that have fit values greater than 1.30 or less than 0.77 did not fit the Rasch model and did not meet the unidimensional construct of the study. In Figure 1, seven items (Items 4, 6, 18, 19, 22, 27 and 40) were considered to be of poor fit and were removed from further analysis (Table 1).

There is considerable debate in the literature for ascertaining the most acceptable range of fit statistics researchers could use in generating surveys. In this study, the selected range of the fit statistics' range was done on the basis of identifying the maximum number of consistent test items used in the survey.

Psychometric qualities of the survey scale: person reliability estimates

The Rasch equivalent of the Cronbach alpha co-efficient which explores the reliability of the survey tool is termed the Person reliability Index (PRI). Its value ranges from 0-1 but unlike like Cronbach alpha values, the PRI is able to analyse participant response patterns independently of the reliability of the scale items. The PRI for this survey was 0.96 confirming that replicability of person placement measured in this survey, could be expected to be achieved again, if another group of nurses were to be given another set of items from the scale (Curtis 2005).

As described earlier, Rasch analysis is concerned with determining if invariance in the data obtained from the survey, violates unidimensionality of the construct being measured, in this case self-reported ability. Differentiated item functioning (also known as item bias) explores if different members or sub-groups in the cohort being measured, differ markedly from the responses generated on the group as a whole (Bond and Fox 2007). If scale items do differ significantly, they are removed and cannot be used to obtain estimates in the future, as they produce invariance. In this instance no differentiated item functioning (bias) was shown according to participant gender.

RESULTS

Sample demographics

A total of 43 registered general nurses completed the study questionnaire. Table 2 reports the sample characteristics. The majority of the sample were female and from general medical areas in the hospital. Overall, the largest proportion of the sample had been in practice for less than 5 years.

The Item Difficulty Map

Figure 2 shows the complexity of the different survey items as rated by the participants based on their self-rated ability to undertake the individual nursing tasks. This logit map identifies the location of the items along the scale on the right with the distribution of the RNs on the left side of the scale.

In Rasch scale maps, the mean of the item values is set at zero (viewed as average ability), with the more difficult scale items located above the item mean and easier scale items below

the item mean. As scale items increase in rated difficulty, their level is demonstrated on the map relative to their positive logit value, while as scale items are rated as being easier, they are positioned on the map relative to their negative logit value. In attitude scales such as this, difficult scale items are those which the RNs are less likely to respond to favourably, while the easier survey items are those with which nurses have greater probability of responding to favourably.

From Figure2, scale items asking RNs about the complexity of adapting nursing interventions in response to individual need is rated as being the most difficult skill for all surveyed nurses to undertake with only two respondents (represented by the two crosses adjacent and just above to the item: at logit +1.9 and +3.2) indicate a probability that these tasks are easier for them compared with the rest of the cohort. Conversely, at logit -1.0 is the survey item asking nurses to rate how complex it is for them to take an alcohol history and this is noted to be the most easiest items for the cohort however, six nurses (note the crosses extending from -2.5 logits up to -1.4 logits) probably rated this task as being more harder for them compared with the rest of the group. It is this conjoint scaling that allows nurse confidence levels to be directly measured against the complexity of the various nursing tasks that is the hallmark of Rasch scaling and serves as a foundation on how to direct future training to maximize nursing care of patients suffering from alcohol-related harm.

DISCUSSION

The Rasch analysis enabled the identification of individual difficulty levels for the forty clinical confidence items. The items identified as most difficult predominantly focused on patient-centred tasks involving assessment and discussion of alcohol-related behaviours. This

resonates with previous research where nurses identified role insecurity and lack of specialist knowledge, training and skills when discussing patient's alcohol-related behaviour (Lock *et al*. 2002, Willaing *et al*. 2005). Despite the length of time since the data was collected, the work is extremely relevant due to the current global context and climate of activity in the field of alcohol interventions and the identification that there is a need for a greater and more relevant focus of alcohol education for pre-registration nursing students across all years of study (Holloway & Webster 2012).

Furthermore these findings are supported by a study of student nurses (Lawrence 2005) which also identified items (32) Asses a patient's readiness to cease their drinking behaviour; (33) Identify a patient's previous attempts to cut down or cease drinking; and (34) Adapt nursing interventions in response individual need, among the hardest.

Subsequently it is possible to suggest that nurse attitudes and role insecurity may be creating a barrier preventing thorough and complete assessment of patients suffering from alcohol-related harm (Lock *et al*. 2002). This may result in under-diagnosis of an alcohol-related problem and have a negative effect on quality of care.

The items identified as easiest incorporated themes of alcohol-related knowledge and clinical skills such as item 16 'observe vital signs of alcohol withdrawal'. This may suggest that nurses have perceived confidence in their knowledge that focused on 'task' orientated clinical skills but struggle to incorporate skills where a 'therapeutic relationship' or patient-centre task is required. The educational implications of these findings would suggest a curriculum addressing key aspects of behaviour change theory i.e self-efficacy and associated interventions in the context of alcohol is warranted. Inconsistencies in results must be

acknowledged, item 2 'Assess whether or not a patient drinks alcohol' is a natural prelude to item 3 'Find out the history of a patient's alcohol use', however, item 2 scored as hard and item 3 scored as easy.

However, it may be that item 3 involves deeper discussion with patients resulting in problems being recognised and nursing intervention required, an area where respondents lack confidence. Discussion with respondents on rationale for answers may provide greater clarity to this discrepancy. The inclusion of role play in the curriculum, where interpersonal skills can be used, may offer increased confidence in this area.

Limitations

The sample size (n=43) and sampling method limits the generalisability of findings. Moreover the demographics create limitations as only six participants were male and the majority were nurses practicing in a medical setting preventing generalisation to the wider nursing population. Factor analysis may have been undertaken, however we were satisfied that items met the unidimensionality demands of the Rasch model. Furthermore several items in the self-rated clinical confidence tool had infit values outside the acceptable range, suggesting possible poor item phrasing (Blackman *et al*. 2006). However this may be the result of the small sample rather than a weakness of the questionnaire design. This could be further addressed in a full scale study. Finally it is also important to recognise that we have measured perceived confidence and not actual ability to perform tasks.

CONCLUSION

The Rasch analyses indicated RNs perceived patient-centred tasks, involving assessment and discussion of alcohol-related behaviours, as most difficult, whereas tasks incorporating themes of alcohol-related knowledge and clinical skills were perceived as easy. These findings are in line with the conjoint measures of nurse ability and nursing skill complexity by Blackman *et al* (2006).

Rasch analysis as used in this study has shown that a scale of learning, matching participant self-rated ability can be directly matched to nursing task complexity. This information can be used by nurse educators to respond fully to the alcohol–related learning needs of their nursing students and the management of skills required by them to provide nursing care to others who experience alcohol-related harm.

A full scale study with larger randomised sample sizes is required to collect adequate data to strengthen the conclusions drawn from the current evidence. From such a study the specific areas identified as most difficult could be the key focus of an education and training programme mapped across the curriculum. An evaluation of the implementation of such a programme could then be conducted.

From a global perspective, lack of confidence and training has been identified beyond the UK. This issue has received attention in Australia (Happell & Taylor 1999), Asia (Tsai *et al* 2010), South America (Rassool *et al* 2006) and the United States of America [USA] (Murray & Savage 2010). This work therefore adds knowledge on an international level to further research, target nursing education and training programmes and the provision of a tool which offers the prospect of evaluating impact.

REFERENCES

Bandura A. (1986) *Social Functions of Thought and Action: A Social Cognitive Theory*. NL:Prentice Hall, Englewood Cliffs.

Blackman I. (2003) '*Nurse ability and the complexity of nursing others with alcohol and tobacco dependence: Bridging the gap with rating scale development and psychometric testing'.* 1st International Alcohol, Tobacco and Other Drugs Nursing and Midwifery Conference: 'Making a World of Difference.' Adelaide, Australia.

Blackman I., deCrespigny C. & Parker S. (2006) Mapping Self-confidence Levels of Nurses in their Provision of Nursing Care to Others with Alcohol and Tobacco Dependence, Using Rasch Analysis. *International Education Journal*. **7**, (3), 245-258.

Bond TG. & Fox CM. (2001) Applying the Rasch model:fundamental measurement in the human sciences. Mahwah, New Jersey:Lawrence Erlbaum Associates.

Bond T. & Fox C. (2007) *Applying the Rasch Model: Fundamental Measurement in the Human Sciences*, 2nd edn. Lawrence Erblaum & Associates. New Jersey.

Curtis D. (2005) *Comparing Classical and Contemporaray Analyses and Rasch Measurement.* In Applied Rasch Measurement: A Book of Exemplars. Edited by Alagumalai S., Curtis D. & Hungi N. Springer Press. The Netherlands.

DeVellis RF (2003) *Scale development: theory and applications*. 2nd edition. Thousand Oaks, CA:Sage Publications.

Groenkjaer M. (2003) *'I try not to be judgmental': Nurses' attitudes, knowledge and practices toward patients with alcohol and drug related problems.* 1st International Alcohol, Tobacco and Other Drugs Nursing and Midwifery Conference: 'Making a World of Difference.' Adelaide, Australia.

Happell B. & Taylor C. (1999) In-service drug and alcohol education for generalist nurses: are they interested? *Journal of Substance Use*, 4, 164-169

Holloway A.S. & Webster B.J. (2012) Alcohol education and training in pre-registration nursing: A national survey to determine curriculum content in the United Kingdom (UK). *Nurse Education Today* Nov 12. doi: 10.1016/j.nedt.2012.10.011.

Ko Y., Lo N-N., Yeo S-J., Yang K-Y., Yeo W., Chong H-C. & Thumboo J (2009) Rasch analysis of the Oxford Knee Score. Osteoarthritis and Cartilage, 17, 1163-1169.

Lawerence, H. (2005) *A Study to Demonstrate the Relationship between Undergraduate Student Nurses' Alcohol-Related Knowledge and their Clinical Confidence in Assessing and Responding to Alcohol Use amongst Patients*. MNurs Dissertation (Unpublished). Nottingham: University of Nottingham

Lock C. A., Kaner E., Lamont S. & Bond S. (2002) A qualitative study of nurses' attitudes and practices regarding brief alcohol intervention in primary health care. Journal of Advanced Nursing **39**, 4, 333-342.

Murray M.M. & Savage C. (2010) Guest Editorial. The NIAAA BSN Nursing Curriculum: A rationale and overview. Journal of Addictions Nursing, 21, 3-5

Pallant JF. & Tennant, A. (2007) An introduction to the Rasch measurement model: An example using the Hospital Anxiety and Depression Scale (HADS). British Journal of Clinical Psychology, 46(1), 1-18.

Rassool G.H., Villar-Luis M., Carraro T,E. & Lopes G. (2006) Undergraduate nursing students' perceptions of substance use and misuse: a Brazilian position. Journal of Psychiatric and Mental Health Nursing, 13, 85-89

Tsai Y-F., Tsai M-C., Lin Y-P., Weng C-E., Chen C-Y. & Chen M-C. (2010) Facilitators and barriers to intervening for problem alcohol use. Journal of Advanced Nursing, 66 (7), 1459-1468

Willaing I. Ladelund S. (2005) Nurse Counselling of Patients With an Over consumption of Alcohol. *Journal of Nursing Scholarship* **1**, 30- 35.

Wu M. L., Adams R. J. and Wilson M. R. (1997) *Conquest: Generalised Item Modelling Software*. ACER: Australian Council for Educational Research, Australia.

Yates S. (2005) Rasch and Attitude Scales: Explanatory Style. In Applied Rasch Measurement: A Book of Exemplars. Edited by Alagumalai,S., Curtis, D, & Hungi, N. Springer Press. The Netherlands.

Table 1 Nurses' self-rated clinical confidence survey questions not fitting the Rasch model

Survey Item Number	Focus of the clinical confidence statement
4	Identify the events and activities which the patient typically associated with drinking.
6	Discuss with a patient their reasons for drinking alcohol.
18	Explain the pharmacology of the Diazepam regime for alcohol withdrawal.
19	Assess the effectiveness of medication for alcohol withdrawal.
22	Describe the acute effects of alcohol on the central nervous system.
27	Orientate a patient experiencing alcohol intoxication or withdrawal.
40	Provide information about specialist alcohol services in your community.

Table 2 Characteristics of the study sample (n=43)

Variable	***n* (%)**
Gender	
Male	6 (14)
Female	37 (86)
Speciality	
Adult	43(100)
Clinical Area of Practice	
Health Care of the Elderly	9 (20.9)
Medical	18 (41.9)
Surgical	7 (16.3)
Critical care	8 (18.6)
Missing data	1 (2.3)
Years of practice	
Less than 5 years	19 (44.2)
5-10 years	10 (23.3)
11-15 years	2 (4.7)
15 or more years	12 (27.9)

Figure 1: Fit indices for self-rated clinical confidence items

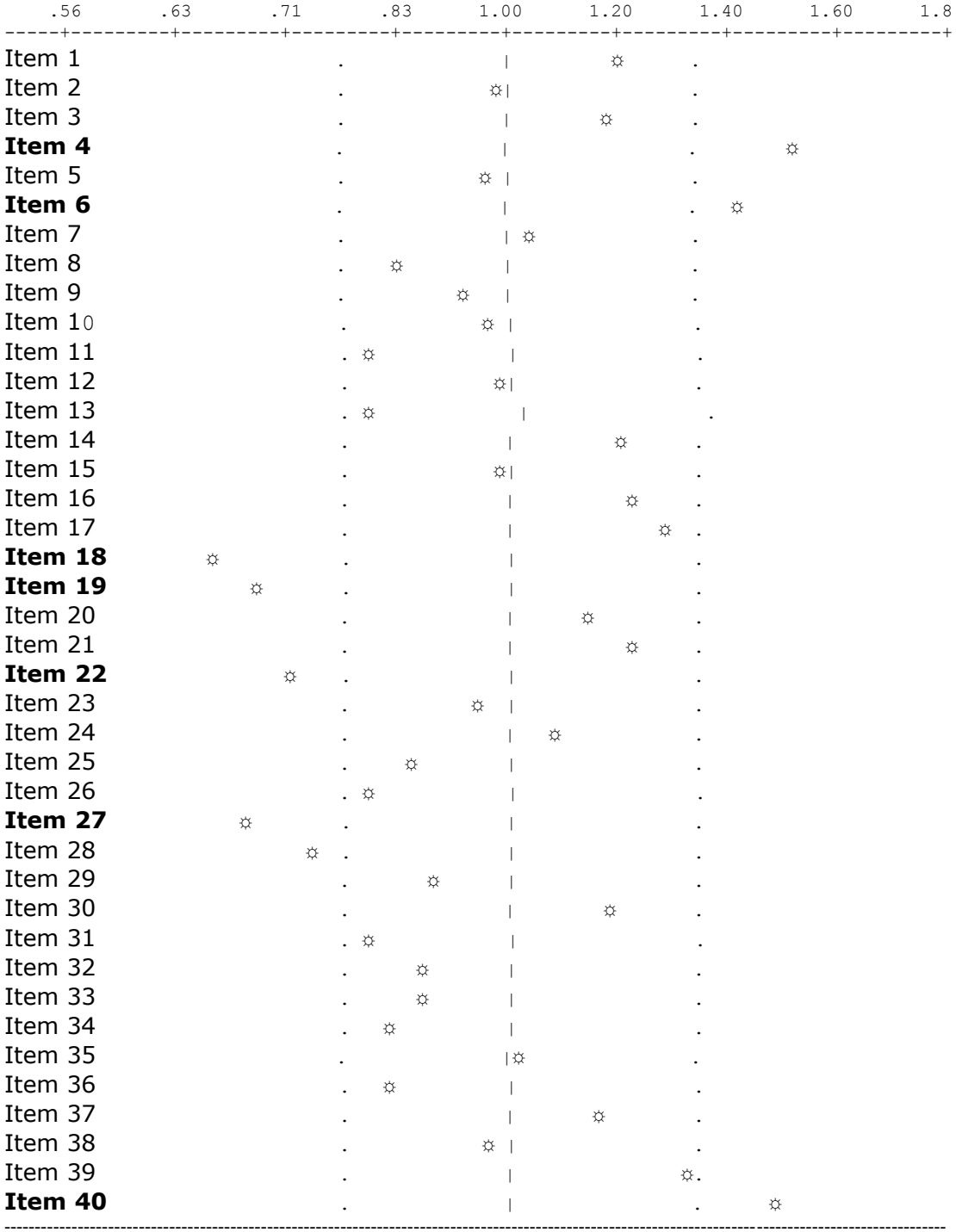
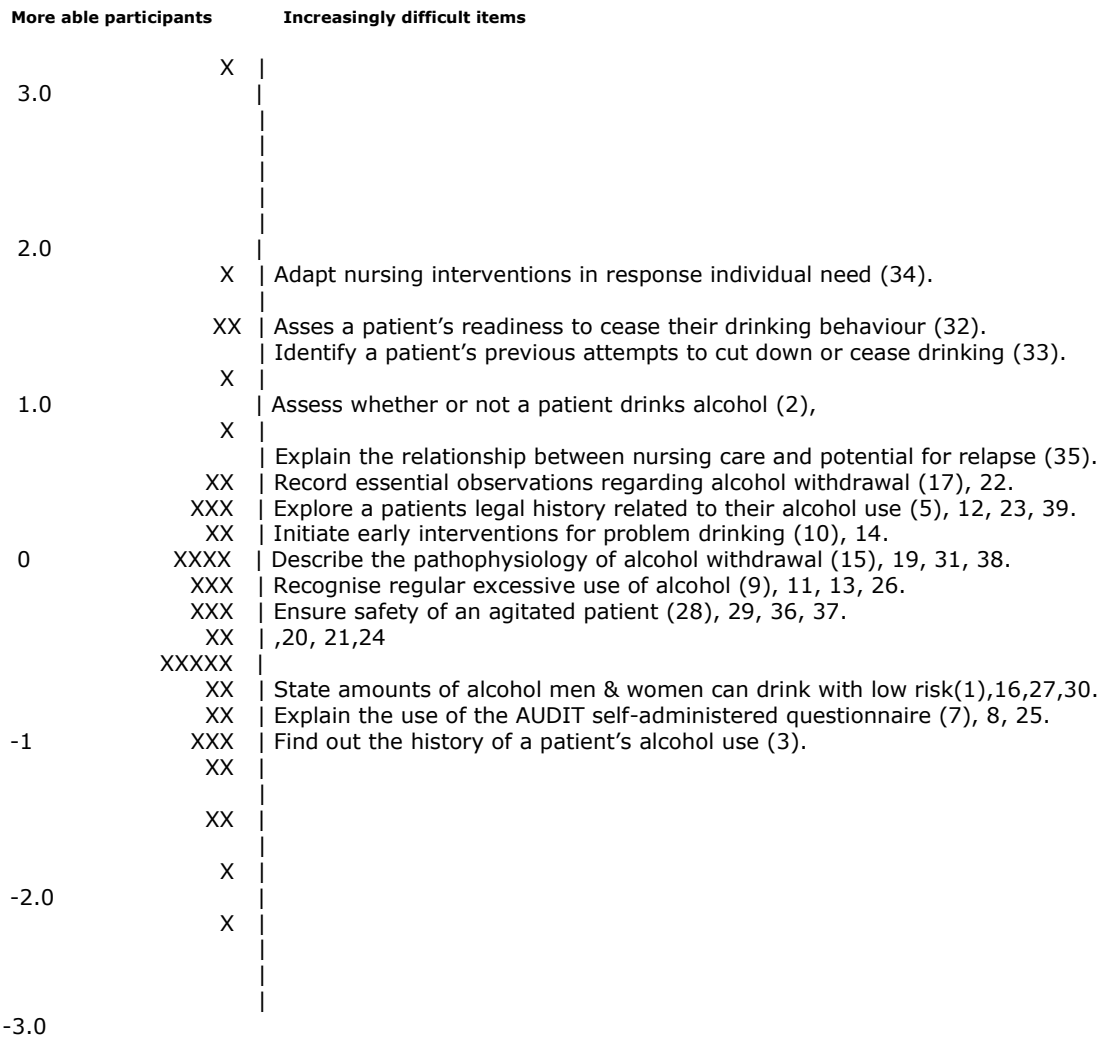


Figure 2 Item difficulty map



1 Each X represents a registered nurse (n=43). Numbers in parenthesis () indicate survey item number and as listed below

Key for survey items as shown

1 - State amounts of alcohol men & women can drink with low risk
2 - Assess whether or not a patient drinks alcohol
3 - Find out the history of a patient's alcohol use
5 - Explore a patients legal history related to their alcohol use
7 - Explain the use of the AUDIT self-administered questionnaire
8 - Explain the importance of knowing the time and date of the patient's last alcohol drink.
9 - Recognise regular excessive use of alcohol
10 - Initiate early interventions for problem drinking
11 - Describe the significance of pathology tests for alcohol related risks and behaviours.
12 - Estimate a patient's insight into their alcohol related risks and behaviours.
13 - Identify a patient's readiness to change their problem drinking.
14 - Recognise the clinical features of alcohol withdrawal
16 - Observe vital signs of alcohol withdrawal
17 - Record essential observations regarding alcohol withdrawal
20 - Provide supportive nursing care for a patient with alcohol withdrawal
21 - Recognise the clinical features of alcohol intoxication.
23 - Provide supportive nursing care for the alcohol intoxicated patient.
24 - Evaluate my own level of safety when nursing an agitated patient.
25 - Stay with an agitated patient.
26 - Calm an agitated patient.
28 - Ensure safety of an agitated patient
29 - Recognise signs and systems of alcohol related liver disease
30 - Differentiate between the acute effects of alcohol and other life threatening medical illnesses.
31 - Describe the relationship between falling BAL and possible impending alcohol withdrawal.
32 - Asses a patient's readiness to cease their drinking behaviour
33 - Identify a patient's previous attempts to cut down or cease drinking
34 - Adapt nursing interventions in response individual need
35 - Explain the relationship between nursing care and potential for relapse
36 - Help a patient whose drinking is out of control.
37 - Explain the relationship between heavy drinking and mental health co morbidity.
38 - Describe the relationship between thiamine deficiency, heavy drinking and Wernicke's Encephalopathy.
39 - Recognise Korsakoff's Psychosis.